

## Earth's Biological History

### 8.2 The student will demonstrate an understanding of Earth's biological diversity over time. (Life Science, Earth Science)

#### 8.2.5 Illustrate the vast diversity of life that has been present on Earth over time by using the geologic time scale.

**Taxonomy level:** 2.2-B Understand Conceptual Knowledge

**Previous/Future knowledge:** Relating diversity of life to the geologic time scale is new content for this grade. This concept will be further studied in high school Earth Science.

**It is essential for students to know** that the geologic time scale is a record of the major events and diversity of life forms present in Earth's history.

- The geologic time scale began when Earth was formed and goes on until the present.
- At the end of each era a mass extinction occurred, many kinds of organisms died out, although there were other extinctions going on during each period of geologic time.
- Using the fossil record, paleontologists have created a picture of the different types of common organisms in each geologic period.

#### *Paleozoic Era*

- Began with the early invertebrates, such as trilobites and brachiopods; continued to develop early vertebrate fish, then arachnids and insects; later came the first amphibians, and near the era's end the reptiles became dominant.
- Early land plants included simple mosses, ferns, and then cone-bearing plants.
- By the end of the era, seed plants were common.
- The mass extinction that ended the era caused most marine invertebrates as well as amphibians to disappear.

#### *Mesozoic Era*

- Reptiles were the dominant animals of this era, including the various dinosaurs.
- Small mammals and birds also appeared.
- Toward the end of the era, flowering plants appeared and the kinds of mammals increased.
- The mass extinction that ended the era caused the dinosaurs to become extinct.

#### *Cenozoic Era*

- New mammals appeared while others became extinct.
- The diversity of life forms increased.
- Flowering plants became most common.
- Humans are also part of the most recent period of this era.

Various models, diagrams, and pictures can be used to illustrate the vastness of time involved in geologic time and to show the diversity of life evident across geologic time. Through the illustrations, not only does the diversity of life-forms increase, but the complexity of those life-forms also increases.

**It is not essential for students to know** in detail the myriads of organisms that appeared during the various periods. They do not have to include the geologic events of each era and/or period,

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but reference to major geologic changes especially continental changes due to plate tectonics is helpful.

#### **Assessment Guidelines:**

The objective of this indicator is to *illustrate* the diversity of life that has been present on Earth over time; therefore, the primary focus of assessment should be to give illustrations of these concepts or use illustrations to show understanding of diversity of life over geologic time. However, appropriate assessments should also require students to *interpret* a diagram of life forms over geologic time; *exemplify* major life forms that dominated an era; or *compare* life forms in one era with those in another.